

Reinaldo Sanchez-Arias

Curriculum Vitae

CONTACT INFORMATION	Program in Computational Science The University of Texas at El Paso 500 W. University Ave. Chemistry/Computer Science Building, 2.0108 El Paso, TX 79968 USA	Mobile: +1-915-603-9553 Fax: +1-915-747-8408 E-mail: rsanchezarias@miners.utep.edu www.math.utep.edu/Student/rsanchez/
RESEARCH INTERESTS	Numerical Optimization, Sparse Representation techniques, Nonlinear Programming, Parameter Estimation, Krylov-based methods, Numerical Linear Algebra, Compressed Sensing, Classification algorithms, Numerical Solution to PDEs.	
EDUCATION	Ph.D. Candidate, Computational Science,	May 2011 - Present
	<ul style="list-style-type: none">• The University of Texas at El Paso, El Paso, TX, USA<ul style="list-style-type: none">– Thesis Topic: “<i>Sparse Representation Methods for Classification</i>”– Advisor: Dr. Miguel Argaez.– Area of Study: Sparse Optimization Methods, Dimensionality Reduction.	
	M.S. Computational Science	May 2011
	<ul style="list-style-type: none">• The University of Texas at El Paso, El Paso, TX, USA<ul style="list-style-type: none">– Thesis Title: “<i>A Sparse Representation Technique for Classification Problems</i>”– Advisor: Dr. Miguel Argaez.– Area of Study: ℓ_1-optimization methods.	
	B.S. Mathematics	May 2008
	<ul style="list-style-type: none">• Universidad del Valle, Cali, Valle, Colombia<ul style="list-style-type: none">– Thesis Title: “<i>A hierarchic a posteriori estimate for the approximation of a nonlinear elastic problem</i>”, Honors Distinction.– Advisor: Dr. Jairo Duque.– Area of Study: Finite Element Methods for Elasticity Problems.	
RELEVANT COURSE WORK	Computational Methods for Linear Algebra, Numerical Optimization, Numerical Partial Differential Equations, Numerical Analysis, Introduction to Computational Science, Mathematical and Computer Modeling, Parallel and Concurrent Programming, Advanced Algorithms, Advanced Numerical Optimization, Digital Signal Processing, and Geophysical Inverse Theory.	
RESEARCH AND TEACHING EXPERIENCE	Research Assistant	January 2009 – present
	Department of Mathematical Sciences, Program in Computational Science, The University of Texas at El Paso	
	<ul style="list-style-type: none">– Implementation of conjugate gradient based methods for solving large scale KKT systems in constrained optimization.	

- Algorithmic implementation for ℓ_1 -underdetermined problems.
- Applications in Compressed Sensing and Classification problems.
- Large Scale Parameter Estimation Problems.

PI: Dr. Miguel Argaez and Dr. Leticia Velazquez.

Research Intern

June 2011 – August 2011

Research and Innovation Geophysics Department,
Repsol USA, The Woodlands, Texas.

- Study and implementation of absorbing boundary conditions for the wave equation.
- Dip and Azimuth angles computation for seismic ray tracing.

PI: Dr. German Larrazabal and Dr. Miguel Argaez.

Teaching Assistant

Fall 2009

Department of Mathematical Sciences,
The University of Texas at El Paso

- Numerical Optimization.

Teaching Assistant

Fall 2008

Department of Mathematical Sciences,
The University of Texas at El Paso

- Calculus and Discrete Mathematics.

Teaching Assistant

January 2007 – June 2008

Department of Mathematical Sciences,
Universidad del Valle. Cali, Colombia.

- Calculus, Linear Algebra, and Differential Equations.

CONFERENCE
PUBLICATIONS

Sanchez R., Argaez M., Guillen P. "Sparse Representation via ℓ_1 -minimization for Underdetermined Systems in Classification of Tumors with Gene Expression Data". In: *IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society*, pp. 3362 - 3366. August 2011.

Guillen P., Martinez-de-Pinson F., Sanchez R., Argaez M., Velazquez L. "Characterization of Subcortical Structures during Deep Brain Stimulation utilizing Support Vector Machines". In: *IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society*, pp. 7949 - 7952. August 2011.

Argaez, M., Ramirez, C., Sanchez, R. "An ℓ_1 -algorithm for underdetermined systems and applications". In: *IEEE proceedings of the North American Fuzzy Information Processing Society*, pp.1 - 6. March 2011.

Velazquez, L., Argaez, M., Sanchez, R., Ramirez, C., Hernandez, M., Culbreth, M., Jameson A. "Hybrid optimization schemes for wing modeling of micro-aerial vehicles". In: *IEEE proceedings of Department of Defense High Performance Computing Modernization Program Users Group Conference*, pp. 149-154. January 2011.

Hernandez, M., Olaya, J., Sanchez, R., Ramirez, C., Romero, R., Velazquez, L., Argaez, M. "Performance Comparison of an HPC ℓ_1 -optimization algorithm for compressed sensing".
In: *IEEE proceedings of Department of Defense High Performance Computing Modernization Program Users Group Conference.*, November 2011.

ORAL
PRESENTATIONS

"Sparse Representation via ℓ_1 -minimization for Underdetermined Systems in Classification of Tumors with Gene Expression Data". *IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society*, Boston, MA, USA. August 2011.

"An ℓ_1 -algorithm for underdetermined systems and applications". *North American Fuzzy Information Processing Society, NAFIPS 2011*. The University of Texas at El Paso, TX USA. March 2011.

"Hybrid Optimization for Parameter Estimation Problems". *The International Conference for High Performance Computing (SC10)*. Demonstration at AHPCRC booth. New Orleans, LA USA. November 2010.

"Hybrid Optimization Schemes for Parameter Estimation Problems". *Army High Performance Research Computing Center (AHPCRC) Annual Review*. Stanford University, Palo Alto, CA USA. July 2010.

"A Path Following Method for large scale ℓ_1 -underdetermined problems". *6th Joint UTEP/NMSU Workshop on Mathematics, Computer Science and Computational Sciences*. The University of Texas at El Paso. El Paso, TX USA. November 2009.

"A Path Following Method for large scale ℓ_1 -underdetermined problems". *XVII Colombian Congress of Mathematics*. Cali, Colombia. August 2009.

POSTERS
PRESENTATIONS

"Project 4-6: Hybrid Optimization Schemes For Parameter Estimation Problems". *Army High Performance Computing Research Center (AHPCRC) Program Management Board Meeting*, Stanford University, Palo Alto, CA USA. November 2011.

"Characterization of Subcortical Structures during Deep Brain Stimulation utilizing Support Vector Machines". *IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society*, Boston, MA USA. August 2011.

"A Sparse Representation Technique for Classification Problems". *7th International Congress on Industrial and Applied Mathematics - ICIAM 2011*, Vancouver, BC Canada. July 2011.

"An algorithm for constrained ℓ_1 -minimization problems and applications". *Sixth Blackwell-Tapia Conference*, Columbus, OH USA. November 2010.

"A Path Following Method for large scale ℓ_1 -underdetermined problems". *Minority Serving Institutions Research Partnerships Consortium (MSIRPC) Conference*, Baltimore, MD USA. April 2010.

"A Path Following Method for large scale ℓ_1 -underdetermined problems". *The International Conference for High Performance Computing (SC09)*, Portland, OR USA. November 2009.

"A Fixed Point Algorithm for ℓ_1 large scale underdetermined systems". *UTEP SACNAS Research Expo 2009*, El Paso, TX USA. April 2009.

“Parallel Global Optimization Schemes for Solving Parameter Estimation Problems”.
The International Conference for High Performance Computing (SC08), Austin, TX
USA. November 2008.

AFFILIATIONS Society for Industrial and Applied Mathematics (SIAM).
American Mathematical Society (AMS).

COMPUTER Programming: MATLAB, C, FORTRAN and some Python.
SKILLS Operating Systems: Windows, Linux.

LANGUAGE Spanish (Native), English (Fluent), French (Intermediate).
SKILLS

REFERENCES – Dr. Miguel Argaez, margaez@utep.edu
(AVAILABLE – Dr. Granville Sewell, sewell@utep.edu
UPON The University of Texas at El Paso. Mathematical Sciences Department.
REQUEST) – Dr. Leticia Velazquez, leti@utep.edu
– Dr. Son-Young Yi, syi@utep.edu
The University of Texas at El Paso. Program in Computational Science.
– Dr. Jairo Duque, jjduque@univalle.edu.co
– Dr. Hector Martinez, hector@univalle.edu.co
Universidad del Valle, Cali, Colombia. Mathematical Sciences Department.